RESEARCH PLAN PROPOSAL

An Empirical Evaluation of Metro Rail System with Special Reference to Jaipur Metro Rail Corporation (JMRC)

For registration for the Degree of

Doctor of Philosophy

IN THE FACULTY OF COMMERCE & MANAGEMENT

THE IIS UNIVERSITY, JAIPUR

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September 2018

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"An Empirical Evaluationof Metro Rail System with Special Reference to Jaipur Metro Rail Corporation(JMRC)"

INTRODUCTON

In this competitive scenario every industry whether it is public or private is being challenged to perform efficiently and for the success, excellence in the operations and working of an industry a critical urge. To compete all kinds of national and international competition, an organization must aim to improve the quality of its product or service, productivity, dynamic operations, maintenance and its responsiveness. The progress of a firm wholly depends on the fulfillment of desired results. In order to achieve best results, an establishment basically needs to accomplish two essential measures. These are: Firstly, to utilize the available resources optimally and in the most efficient manner and secondly, resources should be utilized to complete the goals which are directly related to the organization's objectives.

Metro Rail System

Railway system occupies a very important place in the area of transportation. As compared to other means of transportation system, railways carry a maximum number of passengers in one go and also carry heavy and large loads for long distances which is a great advantage of this particular mode. From the day of its launch in the field of transportation, railway has undergone incredible changes in terms of its rapidity, shape, mode of running and expansion till the distance whatever a human mind can imagine.

Origin and History

The word metro actually comes from an abbreviation from of 'Paris Metropolitan'. That was quickly abbreviated into metro, which become a common word used to designate all subway networks. In some cases, metro is regarded as a rapid transit train system. As of April 2014, 168 metro system in 55 countries are listed. Let us have a peep into the origin and history of the metro system in the world. World's first urban underground railway was the Metropolitan railway which began its operation on January 10, 1863. It was built largely in shallow tunnels and is now part of the London underground. It was worked by steam trains, and despite the creating of numerous vents, was unhealthy and uncomfortable for passengers and operating staff. The idea of an underground railway terminus in its urban Centro was proposed in the 1830s, and the Metropolitan builds such a line in 1854. It opened January 1863 between Paddington and Farrington using gas lit wooden carriages hauled by steam locomotives. It was hailed as a success, carrying 38,000 passengers on its opening day, and borrowing trains from other railway to supplement the services.

Followed by this historical beginning of the transportation system, on July 1872 British company "The Metropolitan Railway of Constantinople to Galata Pera" was registered. On December 5, 1874 the construction was completed and it started carrying people on January 17,1875.The United States have been using the oldest subway tunnel in Boston that is still in use till date from 1897. Later subway lines to carry heavy rail trains were built. The New

York city has world's largest 4-track line, stretching 9 miles (14.5kms). The oldest subway in the Southern Hemisphere, Subterraneos de Buenos Aries, opened in1913 in Argentina. It used to carry 190,000 passengers daily and is a tourist attraction as well.On October 17, 1919 the Madrid Metro was opened, which today is one of the longest metro system in the world. In 1924, Barcelona Metro came into existence.

First underground metro in the USSR was opened in 1935 in Moscow. Moscow Metro is one of the most elaborated decorated underground of the worlds, with its station often been called as underground palace. As of 2012, Moscow metro had 308 kms of railway and 186 stations and is one of the busiest metro system in the world. In later late 20th century, many European metros, some driver less and rubber tired, appeared in medium sized cities, especially in Spain, France and Italy. Meanwhile the Toronto Subway was opened in 1954. The Montreal Metro was a second subway system in Canada and was inaugurated in 1966. The first underground system in Brasil was opened in 1974 in nation's largest city. Metro de Santiago is the metro system serving Santiago in Chile. It is a network of 5 lines with a total of 85 stations, and the only South American rubber tired Metro. In Colombia the Metro de Medellin Company operates in elevated infrastructure in the downtown area and on-level parallel to the river. The construction of the system had astronomical cost overrun that leads to a great public debt. Cairo becomes first African country with Metro system, partly converted from railway line since 1987.

Asia first cities to have subway lines were Tokyo in 1927 and Osaka in 1933. Beijing subway, the first in China began operations. Since 1974, a number of cities in South Korea have developed modern and extensive subway system. Singapore developed Mass Rapid Transits in 1987 which was world's first heavy rail system to feature platform screen doors. Metros were built in Taiwan in 1996, Iran in 1999, UAE in 2009, Saudi Arabia in 2011 and the list continues.

Metro Rail in India

Rapid transit in India consists of Metro, Monorails and light rail system. The first rapid transit system in India was Kolkata Metro, which started operations in 1984. 'ElattuvalapilSreedharan', popularly known as Metro Man was behind this great effort. The metro rail system in India is popularized and developed due to his amazing efforts and hard work. Delhi Metro was India's first modern metro, which began its operation in 2002. Rapid Metro Rail Gurgaon, which started operations in November 2013, is India's first privately owned & operated metro.

Metro rail lines in India are composed of both standard gauges and broad gauges. Project likes in Delhi Metro used broad gauge for their earliest lines, but most of the new project in India is on Standard gauges as rolling stock is imported from Europe is on Standard Gauges. One exception is Ahmadabad Metro, which has planned to use broad gauges, as there is more space available inside the coaches. Indeed, development of metro systems across the globe itself an interested journey. In this great journey, we can find several milestones. The Hong

Kong metro service is equipped with 3G cell phone service, the Copenhagen metro is 24/7 driver less electric system, the Arsenalna metro station in Kiev, Ukraine, is the world deepest (346 feet underground) metro, the Moscow metro is commonly regarded as having the most beautiful stations in the world, the New York City subway (with 468 stations) is the largest subway etc., The journey is not completed. Let's wait for more wonders in metro world.

Jaipur Metro Rail Corporation

Jaipur the symphony in pink, is the land of superlatives, where breathtaking beauty and rich art and culture blend superbly. Until the eighteenth century, Amber served as the capital of the Kachwaha clan of rajputs. However, due to its inaccessible tract on the Aravali hills, it was unable to meet the demands of a growing population. Sawai Jai Singh in 1727 decided to move his capital to the plains, 11km south of Amber. Jaipur situated in North- West part of India, was thus founded in 1727 AD and was named after its founder Sawai Jai Singh. Jaipur city was not only planned but its execution was also coordinated by Sawai Jai Singh II, in such a manner that a substantial part of the city developed up within seven years of its foundation. It nestles amidst the Aravali ranges and is surrounded by rugged hills on three sides, each crowned by a formidable fort, while the city is studded with grand palaces, majestic mansions and gracefully landscaped gardens and parks. It is perhaps the first planned city of India, and was laid with great precision on the basis of principles of "Shilp Shastra", the ancient Hindu treatise on architecture. The city was built in the form of a rectangle divided into block, with roads and avenues running parallel to the sides. In 1863 city of Jaipur was dressed in Pink to welcome Prince Albert, consort of Queen Victoria. The color became an integral part of the city and it came to be known as "The Pink City".

In 19th and 20th centuries the city's population spread beyond its walls. In 1922 Man Singh II, Jaipur's Maharaja ascended the throne and it was during his reign that civic buildings like the secretariat, schools, hospitals and other public buildings were built. The municipality was reorganized in 1926 and a new municipal act was prepared in 1929.

After independence Jaipur merged with the state of Jodhpur, Jaisalmer and Bikaner and become the greater Rajasthan in 1949. Under the State Reorganization Act in 1956, Jaipur became the capital of the state of Rajasthan. Post Independence planned development of the city was taken up, after the city became the capital of Rajasthan.

Though the city has grown into a modern metropolis and a burning commercial center, the city is a visitor's delight and caters to the needs of each form of tourism, ranging from historical, culture, adventure, sports, entertainment, shopping, business, conventions and conferences. Jaipur is also renowned handicraft center and is also known for producing exquisite gold jewelry enameled or inlaid with precious or semi precious stones, blue pottery, carvings on wood, stone and ivory, block print and tie & dye textiles, leather articles, handmade paper, miniature painting etc.

Jaipur city is well connected with other important cities of Rajasthan such as Ajmer, Udaipur, Jodhpur, Bikaner, Alwar, Bharatpur, Jaisalmer and other places of historical importance such as Agra, Gwalior, Khajuraho, Delhi, Chandigarh, Kolkata, Ahmedabad, Mumbai and Lucknow through road and rail linkages.

Description	Phase-1A	Phase-1B	Total Phase-1	Phase-II	Total Phase-I& II
FROM – TO	Mansarovar To Chandpole	Chandpole To BadiChaupar	Mansarovar To BadiChaupar	Sitapura To Ambabari	-
Elevated Route Length (In Kms.)	9.13	Nil	9.13	18.004	27.134
Under Ground Route Length (In Kms.)	0.50	2.349	2.849	5.095	7.944
Total Route Length (In Kms.)	9.63	2.349	11.979	23.099	35.078
Elevated Stations	8	Nil	8	15	23
Under Ground Stations	1	2	3	5	8
Total Stations	9	2	11	20	31
Total Completion Cost (In Crores)	2023	1126	3149	6583	9732
Financial Internal Rate Of Return (FIRR)	-	-	8.24%	7.37%	7.8%
No Of Coaches Required	32	8	40	84	124
Proposed Date Of Commercial Operation	3 June 2015	March 2018	-	-	-
Mode Of Execution	EPC Mode	EPC Mode	-	PPP Mode	-

FACTORS USED FOR THE STUDY

Here researcher has taken three main concepts for the empirical evaluation of the Jaipur Metro Rail Corporation(JMRC). These are-

1) Financial Efficiency

2) Operational Viability

3) Customer(riders) Satisfaction

FINANCIAL EFFICIENCY: The financial evaluation of a public infrastructure project is complex and challenging because of the risks and uncertainties due to the large size, long contract duration, non recourse financing, multiple project participants with different motives and interest, and the complexity of the contractual arrangements. Improved financial engineering techniques are required to overcome the limitations of traditional financial analysis techniques in addressing risks and uncertainties. Financial Efficiency is a measure of the organization's ability to translate its financial resources into mission related activities. Financial Efficiency is desirable in all organizations regardless of individual mission or structure. It measures the intensity with which a business uses its assets to generate gross revenues and the effectiveness of producing, purchasing, pricing, financing and marketing decisions. At the micro level, Financial Efficiency refers to the efficiency with which resources are correctly allocated among competing uses at a point of time. Financial Efficiency is a measure of how well an organization has managed certain trade offs (risk and return, liquidity and profitability) in the use of its financial resources. Financial Efficiency is regarded efficiency and is a management guide to greater efficiency the extent of profitability, productivity, etc.

OPERATIONAL VIABILITY: Operational viability explains about the operational structure of an organization. When we talk about business structure, there are two different approaches, namely the organization structure and the operational structure.In this study researcher focused on the operational structure of a company. While "organizational" refers to business structure, "operational" refers to how things get done. The organizational structure depicts the structure and human resources, the operational structure illustrates the processes of a company. It includes the basic infrastructure and facilities which are used for the process.

Maintaining a steady workflow, whether for producing your product or administration, requires operational procedures. This is best achieved by writing an operation manual with guidelines for each activity of your employees.An operational structure describes a logical and chronological structure of an operation of single sequences and events in processes. A symbolic illustration of sequences and events over an absolute or relative timeline is typical for an operational structure.

CUSTOMER(RIDERS) SATISFACTION: Customer satisfaction is the measure of how the needs and responses are collaborated and delivered to excel customer expectation. It can only be attained if the customer has an overall good relationship with the supplier. In today's

competitive business marketplace, customer satisfaction is an important performance exponent and basic differentiator of business strategies. . Here researcher has taken the perspective of riders to assess the customer satisfaction.Hence, the more is customer satisfaction; more is the business and the bonding with customer. Customer satisfaction is a part of customer's experience that exposes a supplier's behavior on customer's expectation. It also depends on how efficiently it is managed and how promptly services are provided. This satisfaction could be related to various business aspects like marketing, product manufacturing, engineering, quality of products and services, responses customer's problems and queries, completion of project, post delivery services, complaint management etc.

Customer satisfaction is the overall essence of the impression about the supplier by the customers. This impression which a customer makes regarding supplier is the sum total of all the process he goes through, right from communicating supplier before doing any marketing to post delivery options and services and managing queries or complaints post delivery. During this process the customer comes across working environment of various departments and the type of strategies involved in the organization. This helps the customer to make strong opinion about the supplier which finally results in satisfaction or dissatisfaction. It is necessarily required for an organization to interact and communicate with customers on a regular basis to increase customer satisfaction. In these interactions and communications it is required to learn and determine all individual customer needs and respond accordingly. Even if the products are identical in competing markets, satisfaction provides high retention rates. For example, shoppers and retailers are engaged with frequent shopping and credit cards to gain customer satisfaction, many high end retailers also provide membership cards and discount benefits on those cards so that the customer remain loyal to them.

NEED FOR METRO IN JAIPUR

A comprehensive transportation study for the city is already in progress. Public options for a public mass transit system are:-

1) City Buses
2) Bus Rapid Transit System
3) Tramway System
4) A Metro System

The city as a bus system operated and maintained by Rajasthan Roadways and private operators. This is totally inadequate for the needs of the city. The government is also contemplating to introduce Bus Rapid Transit Systems on certain selected routes.BRT has its own limitations and constraints. For one thing, the capacity of a BRT system can at best be only 10000 to 12000 PHPDT (Peak Hour Peak Directions Trips) and that of a tramway system about 8000 to 10000 PHPDT. The BRT takes away two lanes of the road for dedicated use pushing rest of the road vehicles crowded into the remaining road space. Therefore, unless the road widths are more than three lanes in each direction, BRT is not feasible and even then the non-bus riders will be put to tremendous inconvenience. In Delhi BRT has been a total failure. In the case of a Metro system, the road width is not encroached upon. If the Metro is elevated, only the central median of the road to a width of 2 to 3 m. is occupied for locating the columns carrying the rail deck. If the metro is underground, there is no encroachment at all on the road width.

Advantages of Metro System

- Requires $1/5^{th}$ energy per passenger km compared to road based system.
- Causes no air pollution in the city.
- Causes lesser noise level.
- Occupies no road space, if underground and only about 2 meters width of the road, if elevated.
- Carries same amount of traffic as 5 lanes of bus traffic or 12 lanes of private motor cars, if it is a light capacity system.
- Is more reliable, comfortable and safer than road based system.
- Reduces journey time by anything between 50% and 75% depending on road conditions.
- Maximize growth of the Jaipur economy by enhancing its competitive position and facilitating future employment and population growth.

REVIEW OF LITERATURE

Srinivasan, A., &Thampy, A. (2017) In this review, the effect of maintaining exclusive relationships with Government Owned Banks (GOBs) on real investment by publicly traded companies in India is studied. Firms that maintain such exclusive relationships have an investment cash flow sensitivity that is almost 30% lower relative to other firms. GOB relationships also increase sensitivity of investment to Tobin's Q. Exclusive relationships with private banks increase cash flow sensitivity while exclusive relationships with foreign banks have no impact.

Fowowe, B. (2017) In this paper researcher express the importance of the role of finance in the development of the firms. The importance of finance to the growth of firms has been well documented in the literature and the firm-financing gap has become common terminology, depicting the inadequate access to finance faced particularly by firms. Financing is important for firms because it helps in expansion of operations, innovation, and investing in production facilities and new staff.

Maj Syed Mohd Mustafa, Dr.MohdTaqi (2017) A good bank is not only the financial heart of the community but also a helping hand in every possible manner to improve the economic condition of the society. Banks are a fundamental component of the financial system and are also active players in financial markets. The essential role of a bank is to connect those who have capital, to those who seek capital. Banks have control over a large part of the supply of money in circulation. Economic development is a dynamic and continuous process which highly depends upon the extent of mobilization of resources, investment and operational efficiency of various segments i.e. trade, industrial development, and agriculture of the economy. Thus, in a modern economy like India, banks have become a part and parcel of all economic activities.

Baran, D., Pastýr, A., &Baranová, D. (2016) The success of every business enterprise is directly related to the competencies of business management. The business enterprise can, as a result, create variations of how to approach the new complex and changing situations of success in the market. Therefore managers are trying during negative times to change their management approach, to ensure long-term and stable running of the business enterprise. They are forced to continuously maintain and obtain customers and suppliers. By implementing these measures they have the opportunity to achieve a competitive advantage over other business enterprises.

Wahba, H., &Elsayed, K. (2015) This study is aiming to provide some empirical evidence on this issue that may help in explaining divergence in prior work. The key argument in this paper is that corporate social responsibility is expected to affect financial performance positively/negatively, which inturn attracts/repels institutional investors. The possibility that firms can develop a competitive edge over rivals by investing in social responsibility has been made increasingly likely over recent years by changes in investors' behaviour and attitudes towards the society.

Movalia, N. P. (2015) Capital structure is an important decision of the business to fix the mixture of debt and equity capital of the company. This study is on capital structure analysis and its impact on profitability of tyres industry in India. Researcher has taken 14 tyres companies listed under BSE and NSE, by studying Debt-Equity ratio.

Akshay.M.Ramteke , Prof. Vishal Gajghate (2015) The growing demand for public transport in cities has serious effects on urban ecosystems, especially due to the increased atmospheric pollution and changes in land use patterns. An appropriate mix of alternative modes of transport resulting in the use of environmentally friendly fuels and land use patterns can be obtained by an ecologically sustainable urban transport system. Transport, because of its pervasive nature, occupies a central position in the fabric of modern urbanized society. In most of the countries, this has been a story of evolutionary change with new transport development replacing the old transport system in response to perceived socio economic needs of the people. Implementation of such modern transport system of Metro Rail facility to NAGPUR city is the ultimate aim of this project.

Malaya Ranjan Mohapatra., AvizeetLenka, Subrat Kumar Pradhan (2015) The Indian banking system consist a major portion in Indian financial system and in its economy. India is considered as best platform for banking operation for its conservatism practices. In this present study we have analysed the operational efficiency of commercial banks in India with objectives of comparative performance different sectors of commercial banks, profitability position of different sector in relation to number of employees and challenges faced by public sector banks in Indian banking scenario.

Nagarkar, J. J. (2015) Business cycles are not new to the Indian economy. In last ten years India witnessed two major phases of business cycle. High growth tide lifted all boats and high revenue high profits were taken for granted. The last four years have been the phase of recession. Banking industry which was growing at a high growth of +30% now is struggling to achieve 19% growth. This paper is an attempt to analyze performance of five major public, private and foreign sector banks with principle component analysis on the financial parameters. The weights are assigned on the basis of importance of the parameters on financials.

Dr. T. Muthu Pandian and Mr. Narendran (2015) Most of the organizations use financial data to allocate resources to their various departments. Hence to assess the financial health of an organization, analyzing the financial data and financial performance indicators become crucial. This paper deals with the impact of financial performance indicators on profitability of a textile industry. Indian textile industry is the second largest employment generating sector, next to agricultural sector. Financial analysts often assess firm's production and productivity performance, profitability performance, liquidity performance, working capital performance, fixed assets performance, fund flow performance and social performance.

Subburaj, M., Babu, T. R., &Subramonian, B. S. (2015) Dairy Farming is a major occupation of the people of Tamil Nadu, India and it contributes a significant amount to the

growth of our country. Tamil Nadu dairy development department's objectives and its three-tier structure were studied. Through SWOT analysis its strengths, weaknesses, opportunities and threats were analyzed. In this study Tamil Nadu Cooperative Milk Producers Federation is compared with Gujarat Cooperative Milk Producers Federation (AMUL). The major issues influencing the dairy farming are studied through literature survey, field study and researchers experience.

Karri, H., Meghani, K., & Mishra, B. (2015) Banks are playing crucial and significant role in the economy in capital formation due to the inherent nature, therefore banks should be given more attention than any other type of economic unit in an economy. Banking sector is one of the fastest growing sectors in India. Today's banking sector becoming more complex. The objective of this study is to analyze the Financial Position and Performance of the Bank of Baroda and Punjab National Bank in India based on their financial characteristics. This study attempts to measure the relative performance of Indian banks. For this study, researcher have used public sector banks.

Cheng, Q., Goh, B. W., & Kim, J. B. (2014) In this paper, researcher found that internal control over financial reporting affects firm operational efficiency. Operational efficiency, derived from frontier analysis, is significantly lower among firms with material weaknesses in internal control relative to firms without such weaknesses. Remediation of material weaknesses leads to an improvement in operational efficiency. Additional analyses indicate that the negative effect of material weaknesses on operational efficiency is stronger for firms with a greater demand for higher quality information for decision making, for weaknesses that are deemed to be more severe, and to a certain extent, for smaller firms.

Al-Kassar, T. A., & Soileau, J. S. (2014) In this paper researcher examines the performance of the same companies with solvency for predicting bankruptcy and comparison in both models. The research also demonstrates the need to include measures of both financial and non-financial performance in the evaluation as they complement each other. Without both financial and non-financial, the evaluation process is incomplete and does not provide desired results or the correct image of the process.

R.Idhayajothi, .Dr.O.T.V.Latasri, N. Manjula, A.MeharajBanu,R. Malini (2014) Finance is regarded as the life blood of a business enterprise. In the modern oriented economy, finance is one of the basic foundations of all kinds of economics activities .Finance statements are prepared primary for decision -making .They play a dominant role in setting the frame work and managerial conclusion and can be drawn from these statements is of immense use in decision- making through analysis and interpretation of financial statements .

Irimia-Dieguez, A. I., González-Villegas, J. B., & Oliver-Alfonso, M. D. (2014) Research in this field may yield new ideas and theories about the existing theoretical framework on capital structure, stakeholder management and risk management. A case-study is analyzed in this paper: the financial performance of the first metro line in Seville (Spain). In spite of previous cost overruns in the construction stage, the present operation stage is considered successful from the point of view of social and financial profitability, whereby the risks have been theoretically transferred to stakeholders, as defined by Value for Money considerations.

ISLAM, M. A. (2014) Financial analysis is structural and logical way to present overall financial performance of a financial institution. It's also help to evaluate and decision making for business operation. In financial analysis process ratio analysis is the most dominant and logical structure to help business related stakeholder. Under the financial ratio analysis process there are few categories to identical area of financial institution. So business stakeholders try to concentrate to get overall business overview from profitability, liquidity, assets management and solvency ratio analysis.

Sultan, A. S. (2014) Financial Analysis is the process of assessing the financial position of a company by analyzing its stability, viability and profitability. One of the primary objectives of financial analysis is to recognize changes in financial trends, to help measure the progress made by an enterprise and identify a relationship to draw a logical conclusion on the performance of the company. Another major aspect of a financial analysis is comparing the performance of the company with its competitors.

da Silva, C. G., de Castro Pires, M. C., & Terra, F. H. B. (2014) This paper analyses the effects of public debt management in Brazil on the country's yield spread premiums. In other words, researcher examine the responsive behavior of bondholders to changes in the composition of the public debt. It is this paper's assumption that changes in the gap between the yields on short-term and long-term bonds affect individualinvestment behavior and, as result, affect economic activity. Three measures are highlighted: (i) the reduction of securities linked to the Selic benchmark interest rate and to the exchange rate; (ii) the lengthening of the country's debt maturity; (iii) the issuance of external debt bonds denominated in Reais.

Nirajini, A., & Priya, K. B. (2013) Capital structure is a financial tool that helps to determine 'how do firms choose their capital structure?' a firms capital structure is then the composition or structure of its liabilities. In this study, an attempt has been made to analyze the Capital structure and financial performance during 2006 to 2010 (05 years) financial year of listed trading companies in Sri Lanka. For the purpose of this study, the data were extracted from the annual reports of sample companies. Correlation and multiple regression analysis are used for analysis. The results revealed there is positive relationship between capital structure and financial performance.

Adu, G., Marbuah, G., & Mensah, J. T. (2013) In this paper researcher investigate the long-run growth effects of financial development in Ghana. An important statistic for evaluating economic performance of any economy is its annual rate of real GDP growth. As a result, there are large number of studies that attempts to identify the main drivers of economic growth and the potential sources of growth differentials across space and time from both theory and empirical perspectives. The level of financial development has been identified as one of such drivers of growth. The level of financial development in a country should be considered as a composite index derived from a possible large set of proxies.

Singh, A., Anurag, B., & Tandon, P. (2012) Banking Sector plays an important role in economic development of a country. The banking system of India is featured by a large network of bank branches, serving many kinds of financial services of the people. The State

Bank of India, popularly known as SBI is one of the leading bank of public sector in India. SBI has 14 Local Head Offices and 57 Zonal Offices located at important cities throughout the country. ICICI Bank is second largest and leading bank of private sector in India. The Bank has 2,533 branches and 6,800 ATMs in India. The purpose of the study is to examine the financial performance of SBI and ICICI Bank, public sector and private sector respectively.

Salim, M., & Yadav, R. (2012) The financial decision set by management is very important in determining the optimal capital structure. The management of the firm itself has to set their capital structure in a way to maximize their firm value and this decision is really important. However, firms have a different level of leverage and managers try to achieve the best set to attain an optimal capital structure. Researcher reviewed some of the theoretical and empirical evidence concerning the capital structure, and last session indicates empirical results of the empirical analysis and a discussion of the conclusions that can be derived from the results.

Venkatesan, T., & Nagarajan, S. K. (2012) Profitability is the profit earning capacity which is a crucial factor contributing to the survival of the firms. The perpetual existence of the firms depends on the profit earning capacity of the firm, which is also considered to be the main factor in influencing the reputation of the firm. The borrowing capacity of the firm is also determined by Profit. Thus, it is considered as the main factor in determining the capital structure of the firm. Profit, from the accounting point of view, is arrived at by deducting from the total revenue of an enterprise all amount expended in earning that income whereas profitability can be measured in terms of profit shown as a percentage of sales known as profit margin.

Molander, Sofia and Fellesson, Markus (2012) The aim of this paper is to introduce the concept of market orientation into the field of public transport, to review previous research into market orientation in public transport research, and to suggest directions for future research. Market orientation is defined as the generation and dissemination of market intelligence by organizations, as well as responses to it. The review suggests that previous academic research has focused on intelligence generation by developing and using models for measuring travel behaviour, stated preferences, perceived customer quality, and satisfaction. Studies of responsiveness have mainly addressed the physical improvements made in public transport organizations, which is also the primary concern of the industry research accounted for.

Zhang, X. (2005) Governments worldwide have shown increasing initiatives in private finance of public infrastructure and services across a wide range of industries and sectors, including power, transportation, water supply and disposal, telecommunications, oil and gas, mining, schools, hospitals, and military training facilities. Improved deliveries of many major public works and services that would not have been possible without private finance have been widely reported. On the other hand, a number of privatized projects suffered disastrous consequences because of construction cost/duration overruns, changing market demand, depreciation of local currencies and/or reduction in tolls/tariffs by utilities.

Vander Vennet, R. (2002) Financial conglomerates are financial institutions that offer the entire range of financial services. Next to performing the traditional banking operations, they may sell insurance, underwrite securities, and carry out security transactions on behalf of their clients. Universal banks are allowed to hold equity stakes not only in financial but also in non-financial firms. They may vote the shares they own and, if proxy provisions exist, also those they hold in trust for other agents. Nowadays, many countries permit financial conglomeration and universal banking, including all EU member states and, e.g., Switzerland.

Maudos, J., Pastor, J. M., Pérez, F., & Quesada, J. (2002) For many years, a comparison of accounting ratios in the banking sector has shown the existence of remarkable differences in average costs. Wide ranges of return on assets (ROA) and return on equity (ROE) are found, although these results are more difficult to evaluate due to their greater instability. Both types of evidence support the view that differences in the efficiency of banks are due to the existence of a low level of competitiveness. The dispersion of costs and profits among companies and countries continues to be not able, calling into question the suitability of accounting indicators to determine the productive efficiency of banks.

M. Ringle, Christian and Sarstedt, Marko(1998) This study investigates the customer satisfaction of airline passengers and introduces perceived safety as a satisfaction driver, which has not yet been considered in the literature. Applying structural equation modeling to data collected from a sample of airline passengers reveals that perceived safety is one of the key drivers that can explain the degree of overall customer satisfaction. This relationship is, however, strongly moderated by the purposes for which airline passengers travel (i.e., either for business or pleasure). Perceived safety has a significantly greater impact on the overall customer satisfaction of people who travel for pleasure than on that of business travelers, which implies that airlines should more strongly emphasize safety features in advertising aimed at leisure travelers.

Berger, A. N., & Humphrey, D. B. (1997) The primary goal of the researcher is to summarize and critically review empirical estimates of financial institution efficiency and to attempt to arrive at a consensus view. Researcher finds that the various efficiency methods do not necessarily yield consistent results and suggest some ways that these methods might be improved to bring about finding that are more consistent, accurate and useful. Secondary goals of the researcher are to address the implications of efficiency results for financial institutions in the areas of government policy, research, and managerial performance. rear needing additional research are also outlined.

Berger, A. N., & Humphrey, D. B. (1992) Commercial banking is a very difficult service industry in which to measure output, technical change, or productivity growth. First, there is disagreement over which services, banks produce and over how to measure them. In addition, banking services are often priced implicitly through below-market interest rates on deposit balances, making observed revenue flows inaccurate guides to choosing the important outputs to include in the analysis.

RESEARCH GAP

Here are a few findings as per the review done. These are:

- Most of the research studies have been conducted on descriptive analysis of all the variables, i.e. Cost, profitability, solvency, capital structure etc.
- Almost all the studies had been carried out on banks and private sector enterprises with only a few studies in Public Sector Undertaking.
- Primarily studies have been done at National or International level no specific study has been carried out in Rajasthan.
- It has been observed that no specific article includes the relationship between all the important factors of financial efficiency, operational viability and customer satisfaction.

Therefore, further research study can be conducted to find out the correlation among all the important variables, i.e. profitability, solvency, risk, cost, revenue, viability, efficiency and so on.

SCOPE OF THE STUDY

Metro Rail System occupies an important place in the lives of human beings, so this study becomes elegant. The study is conducted with special reference to Rajasthan. Jaipur is the region undertaken for the study in the state of Rajasthan. For this purpose, with the help of secondary data and questionnaires results will be drawn. Aim of the study is to learn about the financial efficiency, operational viability and customer satisfaction in Jaipur Metro Rail Corporation. The result would induct benefit for Metro Rail System.

OBJECTIVES OF THE STUDY

The primary objective of the present study is the empirical evaluation of the Jaipur Metro Rail Corporation and to analyze the critical financial condition of the organization. In order to achieve this primary objective the following supporting objectives are kept.

a) To analyze the financial efficiency and operational viability of the Jaipur Metro Rail Corporation.
b) To examine the operational viability of the Jaipur Metro Rail Corporation in terms of selected determinants.
c) To analyse the impact of selected factors over the satisfaction of riders of the Jaipur Metro Rail Corporation.
d) To study the relationship between the financial efficiency, operational viabilityand customer satisfaction.

HYPOTHESIS OF THE STUDY

Hypothesis is the statement which is yet to be proven. It is used in almost all the research as it validates the assumption of the researcher.Following hypotheses are framed based on the objectives of the study.

H_{01}: There is no significant difference in financial efficiency over the period of study with reference to the Jaipur Metro Rail Corporation.

H_{02}: There is no significant association between selected determinants of operational viability of Jaipur Metro Rail Corporation.

H_{03}: There is no significant impact of selected factors over the satisfaction of the riders of Jaipur Metro.

RELEVANCE OF THE STUDY

Public Sector enterprises play an important role in the growth and development of the Indian economy. We can say that a condition of an economy is majorly depends upon the efficient functioning of the public sector and hence its role is crucial and strategic. The Metro Rail Corporation is no exception as they are providing transport service which is a prerequisite for any activity, whether it is social, economical, political etc. They are playing a pivotal role. Besides, many social obligation events at the cost of their economic viability and profitability are also discharging.

Jaipur Metro has become most preferred mode of public transport system in a very short span of time and it is giving new shape and direction to public transit system. Jaipur Metro is also creating positive impact over the environment, society and economy. This study thoroughly investigates the factors which helps in the empirical evaluation of Jaipur Metro Rail Corporation. It also identifies most important and least important factors responsible for financial efficiency , operational viability and customer satisfaction and analyse the magnitude of each factor.

Apart from analyzing these three factors, this study also gives idea about proposed services of Jaipur Metro based on opinion survey for improving service quality of Jaipur Metro. The thesis also gives future direction and clue to the researchers and study can be carried out for JTC (Jaipur Transport Corporation) buses, Volvo buses, Mono rail, and sub urban railway by modifying the variables of the study based on objectives of the study.

PLAN OF WORK AND METHODOLOGY

Research Methodology is an organized tool, which analyze the methodology using theoretical model applied to the field of study. It encompasses the theoretical analysis of the body of methods and principles associated with a branch of knowledge. Typically, it comprises concepts such a theoretical model, paradigm variables and quantitative or qualitative techniques.

- **The nature of the study:** - The present research is a case study in nature based on the Jaipur Metro Rail Corporation.
- **Nature of data: -**The present study is an evaluation study based on both primary and secondary data. There are various concepts to explain this study. Few concepts are supported by secondary data while few supported by primary data. The secondary data is collected from the annual reports of the Jaipur Metro Rail Corporations. The other relevant data regarding operational viability, profitability and the like have been collected from the websites, magazines, journals and reports. Thus the study has been constructed with the help of both primary and secondary data.
- **Sources of data: -** The data used in the present study has been taken from published annual reports of the Jaipur Metro Rail Corporation. Other relevant data sources are journals, newspapers and internet sources. The primary data is collected by the researcher.
- **Tenure of the study: -** The present study is conducted for the period of three years ranging from 2015-16 to 2017-18.
- **Variables used for the study:-** To explain the working of Jaipur Metro Rail Corporation researcher has selected three major concepts.

1) Financial Efficiency: Variables used to explain the financial efficiency are:

- **Profitability Analysis:**Profitability means ability to make profit from all the business activities of an organization, company, firm, or an enterprise. It shows how efficiently the management can make profit by using all the resources available in the market. According to Harvard& Upton, "profitability is the 'the ability of a given investment to earn a return from its use. It is the ability of the enterprise to get sufficient return on the capital and employees used in the business operation.
- **Cost Analysis:**Conducting a cost analysis, as the name implies, focuses on the costs of implementing a program without regard to the ultimate outcome. A cost analysis is an important first step before you engage in other types of economic evaluation to determine the suitability or feasibility of a potential project.
- **Revenue Analysis:**Revenue analysis helps companies determine how to increase their revenues significantly. When combined with cost analysis, it helps companies do this while keeping costs at a minimum. Revenue analysis aids companies in assessing which course of action produces the highest increase in revenue with the least effort.
- **Working Capital Analysis:**Working capital provides very important information about the financial condition of a company for both investors and managements. For investors, it helps them gauge the ability for a company to get through difficult

financial periods. Whereas, for managing members, it helps them better foresee any financial difficulties that may arise. In conclusion, it is very important for a company to keep enough working capital to handle any unpredictable difficulties.

2) Operational Viability: Variables used to explain the operational viability are:

- **Train Operation Plan and Rolling Stock:** The underlying operating philosophy is to make the MRT System more attractive and economical, the main features being:
  Selecting the most optimum frequency of the Train services to meet sectional capacity requirement during peak hours on most of the sections. Rolling stock is the most maintenance intensive part of the railway system and is the most vulnerable if maintenance is neglected. A stalled train will block a railway immediately and will reduce a timetable on an intensively used system to an unmanageable shambles for the remainder of the day.
- **Power Supply Arrangements:** Electricity is required for operation of Metro system for running of trains, station services (e.g. lighting, lifts, escalators, signaling & telecom, fire fighting, etc.) and workshops, depots & other maintenance infrastructure within premises of metro system. The power requirements of a metro system are determined by peak-hour demands of power for traction and auxiliary applications.
- **Ventilation and Air Conditioning System**:The underground stations of the Metro Corridor are built in a confined space. A large number of passengers occupy concourse halls and the platforms, especially at the peak hours. The platform and concourse areas have a limited access from outside and do not have natural ventilation. It is, therefore, essential to provide forced ventilation in the stations and inside the tunnel for the purpose of:
  - Supplying fresh air for the physiological needs of passengers and the authority's staff;
  - Removing body heat, harmfulodours and gases like carbon dioxide exhaled during breathing;
  - Preventing concentration of moisture generated by body sweat and seepage of water in the sub-way;
- **Train Maintenance Depot:**An essential ingredient in the successful running of a railway is a well maintained system. Train maintenance is very important and this page outlines the methods and systems used in modern train maintenance.

3) Customer(Riders)Satisfaction: Variables used to explain the customer satisfaction are:

- **Safety and Security Services:** Safety is very strong satisfaction driver. The responsibility of security of Jaipur Metro has been entrusted to Rajasthan Police. A strength of 789 police personnel has been sanctioned for security and policing of Jaipur Metro. Latest security equipments have been provided at all Metro Stations.Closed-circuit cameras are used to monitor trains and stations, and feed from these is monitored by Rajasthan Police and Jaipur Metro authorities at their respective control rooms. In addition metal detectors, X-ray baggage inspection systems, and dog squads are also deployed which are used to secure the system. Each of the underground stations has about 45 to 50 cameras installed while the elevated stations have about 16 to 20 cameras each. The monitoring of these cameras is done by the Rajasthan Police, which is in charge of security of the Metro, as well as the Jaipur Metro Rail Corporation.

- **Ticketing Services:**For the convenience of customers, Jaipur Metro commuters have three choices for ticket purchase. The RFID (Radio-frequency identification) tokens are valid only for a single journey on the day of purchase and the value depends on the distance travelled, with fares for a single journey ranging from □5 to □15. Fares are calculated based on the origin and destination stations using a fare chart and it also depends on peak rush in Metro Travel cards are available for longer durations and are most convenient for frequent commuters. They are valid for three years from the date of purchase or the date of last recharge, and are available in denominations of □100 to □1,000. 10%-15% discount is given on travels made on it depending on actual fare. A deposit of □50 needs to be made to buy a new card which is refundable on the return of the card any time before its expiry if the card is not physically damaged. Tourist cards can be used for unlimited travel on the Jaipur Metro network over short periods of time. There are two kinds of tourist cards valid for one and three days respectively.
- **Platform and Train Specific Services:**Customer satisfaction depends on tangible platform amenities and train specific services. Platform services include enquiry handling at platform, medical facility, food and drinking facility on the platform, connectivity of station with the road, number of entry and exit points at the platform, information display system on the platform, clarity of announcement, provision of wheel chair for physically challenged person etc. Train specific services are concerned with proper ventilation and cleanliness inside the train, journey comfort, timing of the train, and adequacy of seat reserved for senior citizen and women.
- **Employees Driven Services:** Employees driven services can be judged on the basis of dimension of the service quality. Employees driven services include consistency in delivery of services, prompt services, capabilities of employees to develop trust and confidence in the mind of customers for providing defect free services.
- **Parking Services**: The JMRC (Jaipur Metro Rail Corporation) will develop an underground parking for 150 cars at Badi Chaupar Metro station in the Walled City.This will be the first that will be developed under the Metro phase I (B) project in the heritage Walled City.The parking will be developed on the reversal line between Badi Chaupar & Ramganj area, according to JMRC officials.

❖ **Tools used for the study:-**Regression t- test, f-test, ANOVA, ratio analysis, trend analysis and comparative statement analysis.

RESEARCH DESIGN

The proposed study will be based upon the following research design:

The exploratory research design is used for the study as there were not many earlier studies related to the Jaipur Metro Rail Project. This research design best suits to gain insight and familiarity into the phenomenon.

- **Data collection**

  Data will be collected from the population using Metro Rails with the help of a questionnaire. The secondary data will be collected throughpublished annual reports of the Jaipur Metro Rail Corporation, research papers, publications, journals and web.

- **Universe of the study**

  The universe in the study is infinite, i.e. the source list was available to a number of people who have been used Jaipur Metro Rail Phase 1 during last three years. (Table 2)

- **Size of the sample**

  Sample is derived from the population on average basis and using sampling formulas.

Margin of error : 5%

Confidence level: 95%

According, to the Krejcie Morgan formula sample size is considered as382(According to the Krejcie Morgan table). (Table 1)

Krejcie Morgan formula: $s = X^2 NP(1-P) / d^2 (N-1) + X^2 P(1-P)$

Where,

s = Required sample size

X^2 = The table value of chi-square for 1 degree of freedom at the desired confidence level (0.05 = 3.841).

N = The population size

P = The population proportion (assumed to be 0.50 since this would provide the maximum sample size

d = The degree of accuracy expressed as a proportion (0.05)

Also by applying Sloven's sampling formula researcher get the sample size of 399.

Sloven's Formula: $n = N/1+Ne2$

Where,

n = Sample size

N = Population size

e = Margin of error

1 = Constant value

Hence, the sample size for the study is taken as 400 respondents.

- **Sampling Technique**

Simple Random Sampling is the preferred method in this study as a complete list of subject to be studied is available, size of the universe is known, desired sample size is specified and there is equal chance of each element to get selected.

LIMITATIONS OF THE STUDY

Jaipur Metro is a rapid transit system in the city of Jaipur, Rajasthan. Construction of the most elevated part of the first line, called Phase 1A, comprising 9.63 kilometers (5.9mi) of the route from Mansarovar to ChandpoleBazaar, started on 13 November 2010, and was completed in 2014. The projects, commercial run was delayed to December 2014, and then to April 2015. After receiving safety clearance from the commissioner of Metro Rail Safety (MRS) in May 2015, Jaipur Metro began commercial service between Chandpole and Mansarovar on 3rd June, 2015. The Jaipur Metro Rail System is India's sixth metro rail system after those in Kolkata, Delhi NCR, Bangalore, Gurgaon and Mumbai. Jaipur Metro is the first metro in India to run on double safety elevated road and metro track.

From the above information we came to know about some important limitation of the study. These are:-

- The present study is limited to only three year time period (2015-16 – 2017-18)

SCHEME OF CHAPTERIZATION

Title	
List of Abbreviations	
List of Tables	
List of Figures	
CHAPTER 1	**INTRODUCTION TO METRO RAIL SYSTEM**
1.1	Introduction
1.2	Evolution of Metro Rail System
1.3	Historical Background of Metro Rail System
1.4	Metro Railways General Rules and Policies
1.5	Operation and Maintenance
1.6	Metro Rail in Various States in India
1.7	Recent status of Metro Rail in India
CHAPTER 2	**JAIPUR METRO RAIL CORPORATION**
2.1	Evolution of Jaipur Metro Rail Corporation
2.2	Operation of Jaipur Metro rail Corporation
2.3	Conceptual framework of the study
2.4	Various aspects of the study
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CHAPTER 3	**RESEARCH METHODOLOGY**
3.1	Problems Statement
3.2	Review of Literature
3.3	Research Gap

3.4	Justification and Relevance of the Study
3.5	Objectives of the Study
3.6	Hypotheses
3.7	Research Design
3.8	Scope of the Study
3.9	Data Collection
3.10	Statistical tools for Hypothesis Testing
CHAPTER 4	**DATA ANALYSIS AND INTERPRETATION**
CHAPTER 5	**FINDINGS, CONCLUSION AND SUGGESTIONS**
5.1	Findings of the Study
5.2	Conclusion
5.3	Suggestions
5.4	Limitations of the Study
5.5	Scope for further Research
Bibliography and Webliography (Websites)	
References	
Appendices	

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SOURCE: GOOGLE SCHOLAR

APPENDIX

TABLE 1:

Required Sample Size†

Population Size	Confidence = 95% Margin of Error				Confidence = 99% Margin of Error			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	196	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1067	427	636	827	1119
1,500	306	515	759	1297	460	712	959	1376
2,000	322	563	869	1655	498	808	1141	1785
2,500	333	597	952	1984	524	879	1288	2173
3,500	346	641	1068	2565	558	977	1510	2890
5,000	357	678	1176	3288	586	1066	1734	3842
7,500	365	710	1275	4211	610	1147	1960	5165
10,000	370	727	1332	4899	622	1193	2098	6239
25,000	378	760	1448	6939	646	1285	2399	9972
50,000	381	772	1491	8056	655	1318	2520	12455
75,000	382	776	1506	8514	658	1330	2563	13583
100,000	383	778	1513	8762	659	1336	2585	14227
250,000	384	782	1527	9248	662	1347	2626	15555
500,000	384	783	1532	9423	663	1350	2640	16055
1,000,000	384	783	1534	9512	663	1352	2647	16317
2,500,000	384	784	1536	9567	663	1353	2651	16478
10,000,000	384	784	1536	9594	663	1354	2653	16560
100,000,000	384	784	1537	9603	663	1354	2654	16584
300,000,000	384	784	1537	9603	663	1354	2654	16586

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TABLE 2:

First 37 months average ridership			
Operation (Average)	**2015-16**	**2016-17**	**2017-18**
Per month	824589	601836	513772
Per day	27222	19777	16890
Per hour	1847	1288	1098
Per train	206	147	126
Highest	105541	36033	27951
Lowest	8318	6916	4747